WE CLAIM:

1. An optical sensor comprising at least two sensing regions located proximate to each other wherein one of the sensing regions is a pressure sensing region and comprises a sealed cavity having a first and a second reflecting surfaces, wherein the distance between the first and second reflecting surfaces changes in response to a change in pressure, and wherein a first reflected light and a second reflected light from said reflecting surfaces formed an interferometric signal representative of a pressure at the location of the optical sensor.

2. The optical sensor of claim 1, wherein a launch waveguide is operatively connected to the sealed cavity and projects light into the sealed chamber.

3. The optical sensor of claim 2, wherein the sealed cavity is defined by a hollow tube, the launch waveguide and a distal member and wherein the tube is sealed to the launch waveguide and the distal member.

4. The optical sensor of claim 2, wherein the sealed cavity is defined by an end cap and the launch waveguide.

5. The optical sensor of claim 2, wherein the sealed cavity is defined by two half-cups and the launch waveguide.

6. The optical sensor of claims 3 to 5, wherein the cavity is sealed by conductive heating, arc welding, laser welding, FRIT glass, solder glass, molecular polishing, epoxy, adhesive or anodic attachment.

7. The optical sensor of claim 3, wherein the distal member is a reflective waveguide.

8. The optical sensor of claim 3, wherein the distal member is a disk.

9. The optical sensor of claim 3, wherein the distal member is an end cap

10. The optical sensor of claim 1, wherein at least one of the two reflecting surfaces is coated with an optical coating.

11. The optical sensor of claim 10, wherein both of the reflecting surfaces are coated with different optical coating.

12. The optical sensor of claim 10, wherein the optical coating is selected from a group consisting of magnesium fluoride, metal oxides, silicon monoxide, zirconium oxide, tantalum oxide, niobium oxide, silicon carbide, aluminum oxide, silicon, gold, aluminum, titanium, nickel, chromium and combinations thereof.

13. The optical sensor of claim 1, wherein at least one of the two reflecting surfaces is modified.

14. The optical sensor of claim 13, wherein at least one of the two reflecting surfaces forms a lens.

15. The optical sensor of claim 1, wherein said cavity comprises a gas.

16. The optical sensor of claim 1, wherein said cavity comprises a partial vacuum.

17. The optical sensor of claim 16, wherein said partial vacuum is provided by vacuum fixturing process.

18. The optical sensor of claim 16, wherein said partial vacuum is provided by gas diffusion process.

19. The optical sensor of claim 1, wherein said cavity comprises borosilicate glass.

20. The optical sensor of claim 1, wherein the other sensing region is a temperature sensing region.

21. The optical sensor of claim 20, wherein the temperature sensing region comprises a temperature sensitive material.

22. The optical sensor of claim 21, wherein the temperature sensing region comprises a third reflecting surface.

23. The optical sensor of claim 22, wherein the second reflected light and a third reflected light from the third reflecting surface formed an interferometric signal representative of a temperature at the location of the optical sensor.

24. The optical sensor of claim 22, wherein the temperature sensing region further comprises a fourth reflecting surface and wherein a third reflected light and a fourth reflected light from the third and fourth reflecting surfaces formed an interferometric signal representative of a temperature at the location of the optical sensor.

25. The optical sensor of claim 24, wherein the first and second reflecting surfaces are connected to the third and fourth reflecting surfaces by a reflective waveguide.

26. The optical sensor of claim 20, wherein the temperature sensing region is located within the sealed cavity.

27. The optical sensor of claim 20, wherein the temperature sensing region is spaced apart from the sealed cavity.

28. The optical sensor of claim 21, wherein the temperature sensitive region forms a part of the cavity wall.

29. The optical sensor of claim 21, wherein the temperature sensitive material comprises a member selected from a group consisting of silicon, sapphire, silicon carbide, tantalum oxide, metal oxides and combinations thereof.

30. The optical sensor of claim 26, wherein the temperature sensing region is connected to a distal member.

31. The optical sensor of claim 30, wherein the distal member is an end cap or a disk.

32. The optical sensor of claim 30, wherein the distal member is a reflective waveguide and wherein the reflective waveguide is modified to limit reflection from the reflective waveguide.

33. The optical sensor of claim 32, wherein the distal end of the reflective waveguide is cleaved, tapered, bent, angled or polished.

34 The optical sensor of claim 23, wherein the second and third reflecting surfaces define a diaphragm and wherein in response to pressure the diaphragm changes the distance between the first and second reflecting surfaces.

35. The optical sensor of claim 2, wherein the sealed cavity has a unitary construction and is defined by a tube fused to the launch waveguide and to a capillary tube.

36. The optical sensor of claim 35, wherein the tube and the capillary tube are made from materials having similar coefficient of thermal expansion.

37. The optical sensor of claim 36, wherein the length that the capillary tube extends inside the cavity is substantially close to the length of the cavity to compensate for the thermal expansion on the distance between the first and second reflecting surface.

38. The optical sensor of claim of claim 36, wherein the tube and capillary tube are made from the same material.

39 The optical sensor of claim 38, wherein the tube and capillary tube are made from fused silica.

40 The optical sensor of claim 39, wherein the other sensing region is a temperature sensing region and the temperature sensing region is disposed inside the capillary tube.

41. The optical sensor of claim 40, wherein the temperature sensing region is made from a temperature sensitive material.

42. The optical sensor of claim 41, wherein the capillary tube further comprises a hollow portion to minimize reflected light

43. The optical sensor of claim 41, wherein the distal end of the capillary tube is modified to minimize reflected light.

44. The optical sensor of claim 43, wherein the distal end of the capillary tube is cleaved, tapered, bent, angled or polished.

45. The optical sensor of claim 2, wherein a launch waveguide is located spaced apart from the sealed cavity and projects light into the sealed cavity.

46 The optical sensor of claim 45, wherein the distal end of the launch waveguide is angled so that light propagating through the launch waveguide is directed into the cavity.

47. The optical sensor of claim 45, wherein the launch waveguide is fixedly attached to the sensor.

48. The optical sensor of claim 45, wherein the sensor is made from wafers.

49. The optical sensor of claim 48, wherein the wafers are polished to a molecular level so that the wafers are bonded to each other.

50. The optical sensor of claim 45 further comprising a temperature sensing region, wherein light from the launch waveguide propagates through the temperature sensing region before propagating through the sealed cavity.

51. The optical sensor of claim 3, wherein the hollow tube and the distal member are made from metal and the hollow tube is welded to the distal member.

52. The optical sensor of claim 51, wherein the launch waveguide is disposed within a metal sheath and the metal sheath is welded to the hollow tube.

53. The optical sensor of claim 52, wherein the metal comprises titanium.

54. The optical sensor of claim 20, wherein the sensor measures the pressure and temperature at a predetermined downhole location in an oil or gas well.